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608,048



Convention Date (France): June 14, 1945.

Application Date (in United Kingdom): Nov. 13, 1945. No. 30322/45.

Complete Specification Accepted: Sept. 9, 1948.

Index at acceptance:—Class 83(iii), W(1b7:4:7b5:7b8:12).

COMPLETE SPECIFICATION.

Improvements in the Mounting and the Control of a Work
Carrying Plate in a Metal-Cutting Machine Tool.

We, Ateliers G. S. P. GUILLEMIN, SERGOT, PEGARD, a French Body Corporate, of 8 rue Yvon, Villeneuve, Paris, France, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

Our invention has for its object improvements in the mounting and the control of a work-carrying plate in a metal cutting machine tool.

According to the invention the plate is rigidly coupled with a worm-wheel which rests directly on a plane bearing of a bearing member whereby the friction produced by the movement of the plate occurs between said wheel and said bearing member, the plate has a conical element seated in conical surface carried by said bearing member, and means are provided for effecting relative rotary adjustment between the conical element and the bearing member, said means extending to an exteriorly accessible adjusting position.

The cutting of the worm-wheel may be effected while using as a bearing surface on the cutting machine the surface of the worm-wheel which is to bear against the bearing member so as to eliminate thus any error or distortion in the cut part of the worm-wheel which might arise, if the plate were to rest directly on the slideway. Lastly it is possible to give a massive shape to the worm-wheel which ensures the indeformability of the worm-wheel, provides for the accuracy of the operation of the wheel and enables a very accurate division of the worm-wheel to be effected.

A characteristic feature of the invention relates to the adjustment of the conical bearing of the plate. Ordinary devices with a single centering generally provide a bearing on the member centered both on a plane surface and on a cone. Such arrangements are difficult to execute per-

fectly and do not allow compensation for wear of the part. These disadvantages are removed in the arrangement according to the invention. The conical element of the plate may engage a ring of corresponding shape provided with a thread meshing with a nut carried with the bearing member, and this ring is arranged to be adjusted from an exteriorly accessible position. It is thus possible at any moment and without any dismantling to compensate for play due to wear.

A further feature of the invention relates to the compensation of the play in the system including the worm and the worm-wheel. One of the conditions providing for perfect operation of the machine consists in the accurate meshing without play in the system comprising the worm and the worm-wheel and operating the work-carrying plate. In conformity with the invention and in order to provide for the compensation of wear in this gearing, the bearings for the worm-wheel form part of a support rigid with the bearing member and there is inserted between the latter and the support a shim the thickness of which is selected so as to obtain a meshing of the gearing without play. After wear, the adjustment of the meshing can be effected by grinding down the thickness of the shim.

According to a further feature of the invention, the slide forms an oil reservoir. A small oil pump may be actuated by a cam carried by the plate and forces the oil on to the parts to be lubricated, chiefly the conical bearing of the plate and the interstices between the worm-wheel and the bearing member.

The driving shaft of the apparatus may be enclosed in a fluid tight manner so as to avoid the outflow of any oil and to prevent the entrance of shavings and of dust.

The accompanying drawings show by

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way of example and by no means in a limitative manner the application of the invention to the work-carrying plate of a metal cutting machine.

5 In said drawings:—

Fig. 1 is a partly elevational and a partly cross-sectional view.

Fig. 2 is a plan view partly sectional showing a development through line II-II 10 of Fig. 1.

As apparent in the drawings, the work-carrying plate 1 is rigidly connected to a helical wheel 2 driven by a worm 3. The latter is driven through the agency of two 15 spur gear wheels 4, 5 by a splined shaft 6 driven from the usual gear box of the machine. Said helical wheel 2 rests directly on the plane bearing of a bearing member 7. The friction produced by the 20 rotation of the plate is therefore exerted between the wheel 2 and the bearing member 7 with the advantage above disclosed. The conical tail end 1a of the plate 1 engages a ring-shaped member 8 inside 25 which it rests without any play. This ring-shaped member 8 is mounted inside the slide-way 7 and may rotate therein. It is provided with a thread engaging a nut 9 secured to the slide-way. Inside the ring-shaped member 8 is also cut helical teeth 30 8a meshing with a worm 10 which may be controlled through a removable key or crank 11, from an exteriorly accessible position.

35 The adjustment of the conical bearing or the compensation of the wear is effected as follows: A locking nut 12 is first released after which the worm 10 is operated which screws the ring-shaped member 8 40 into or out of the stationary nut 9 so that said ring may be raised or lowered and produce the desired adjustment. This being provided, the nut 12 is screwed down again and a further nut 13 is adjusted for 45 preventing any rising movement of the plate and it is locked by means of a bolt 14.

In order to provide for a compensation of the wear between the worm 3 and the wheel 2, the bearings of this worm are 50 carried by a support 15 which is secured to the bearing member 7 through screws 30. Between this support 15 and the bearing member 7 is inserted a distance piece or shim 16 the thickness of which 55 is selected so as to obtain meshing without play. When any wear has arisen between the worm and the wheel it is compensated for by reducing the thickness of this shim. When the support 15 is thus moved, the 60 wheel 4 moves tangentially with reference to the wheel 5 so that the relative effective position between these two wheels is not substantially modified.

For lubrication purposes the bearing 65 member 7 forms an oil reservoir the level

of which is visible through a window 17. The worm 3 picks up oil from the reservoir. The lubrication of the conical element 1a of the plate and of the bearing surface between the wheel 2 and the bearing member 7 is provided for by a piston 70 pump 19 incorporated in the machine. A cam 18 secured to the wheel 2 provides at every revolution for a downward movement of the piston 19 urged against the 75 cam by a spring. Balls serve as suction and delivery valves. The oil is forced into a chamber 24, lubricates the conical portion of the plate and the bearing surface of the wheel after which it returns 80 from the conical element back to the reservoir.

The controlling shaft 6 may slide longitudinally. It is splined so as to provide 85 for the driving of the wheel 4. It is essential for the oil lubricating the wheel and the driving worm to be perfectly free of any extraneous particles. In order to avoid the oil from exuding through the splines and in order to prevent the 90 entrance of any shavings and dust, the shaft 6 is surrounded by a tube 25 closed by a plug 24a attached to a bearing 26. A sealing ring 28 completes the fluid tightness of the arrangement. 95

A felt member 29 inserted in a circular groove of a cover 31 of the bearing member prevents the shavings from reaching the frictionally engaging member.

The above arrangements are disclosed 100 only by way of example and all the details of execution, shapes, sizes and material may vary according to the case without departing from the scope of the invention as defined in the accompanying claims. 105

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:— 110

1. Mounting and control means for a work-carrying plate of a metal cutting machine wherein the plate is rigidly coupled with a worm-wheel which rests directly on a plane bearing of a bearing 115 member whereby the friction produced by the movement of the plate occurs between said wheel and said bearing member, the plate has a conical element seated in conical surface carried by said bearing 120 member, and means are provided for effecting relative rotary adjustment between the conical element and the bearing member, said means extending to an exteriorly accessible adjusting position. 125

2. Means as claimed in Claim 1 wherein the conical tail-end of the plate engages a ring-shaped member provided with a thread meshing with a nut secured to the bearing member, whereby the rotation of 130

said ring provides for the adjustment of the plate.

3. Means as claimed in any of the preceding claims wherein the worm-wheel is engaged by a worm supported in bearings which are mounted on a support that is carried by the bearing member with the interposition of shims the thickness of which may be reduced as required for compensation of wear.

4. Means as claimed in Claim 3 wherein the worm is driven by spur wheels carried by the same support the arrangement being such that the adjustment providing for a compensation of wear does not affect the relative effective positions of the spur wheels.

5. Means as claimed in any of the preceding claims wherein lubrication is provided by an oil pump constituted by a cylinder and a spring urged piston adapted to be displaced by a cam surface on the plate at each revolution thereof.

6. Means as claimed in any of the preceding claims having a driving shaft enclosed inside a sheath formed by a tube provided with fluid-tight packings.

7. Means as claimed in any of the preceding claims wherein a fluid-tight packing is inserted underneath the edge of the plate and extending between the latter and the worm support, so that all the mechanism including the oil reservoir and the pump are enclosed.

8. An arrangement for the mounting and control of the work-carrying plate of a metal cutting machine tool and a machine tool incorporating same substantially as described with reference to and as illustrated in accompanying drawings.

Dated this 13th day of November, 1945.

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Printed for His Majesty's Stationery Office by Wickes & Andrews, Ltd., E.C.4 39/244.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies, price 2s. 0d. each (inland), 2s. 1d. (abroad) may be obtained.

[This Drawing is a reproduction of the Original on a reduced scale.]

FIG. 1

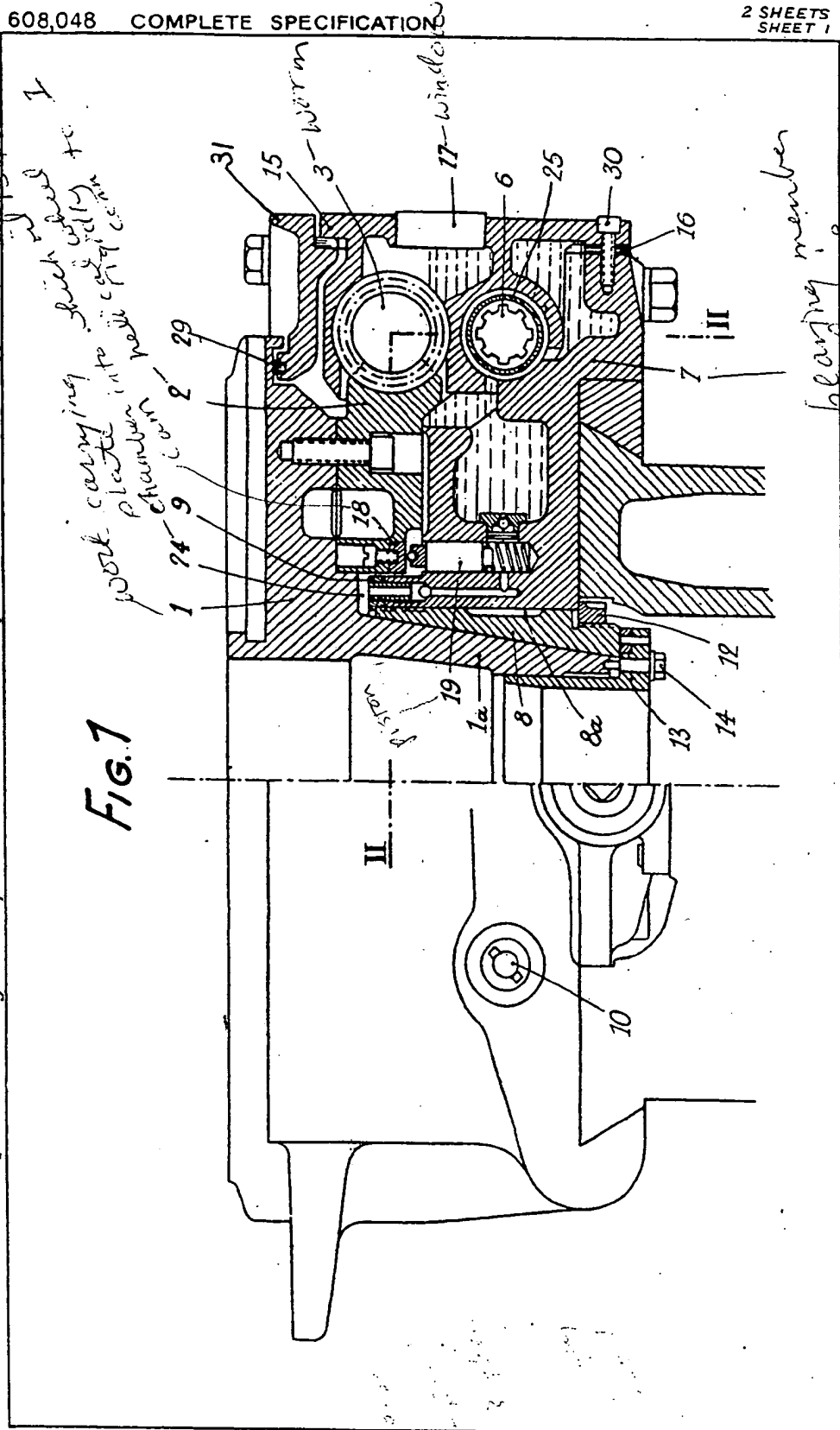


FIG. 2

[This Drawing is a reproduction of the Original on a reduced scale.]

